

Historical Glacier Variations in Southern South America since the Little Ice Age: Examples from Lago Viedma (Southern Patagonia) and Mendoza (Central Andes), Argentina

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The evaluation of historical information can give valuable insight into past glacier dynamics, especially before the onset of modern measurements. Early photographs and maps depict changes for selected glaciers in southern South America. Within this study, written documents and pictorial historical records (drawings, sketches, engravings, photographs, chronicles, topographic maps) are analysed critically, with a particular focus on two regions: Lago Viedma (El Chaltén, southern Patagonia, 49.5°S, 73.0°W) and the Río Mendoza basin (Mendoza, central Andes, 33.1°S, 69.9°W).

For the Lago Viedma area, early historical data for the end of the 19th century stem from the expedition of the Chilean-Argentinean border commission. In addition, the expedition by the German Scientific Society, conducted between 1910 and 1916, and the later photographs by Alberto M. de Agostini give an excellent depiction of the glaciers. Glaciar Viedma is a calving glacier which shows distinct retreat from 1896 until the present (though with a stationary or possibly advancing glacier front between 1930/31 and 1951/52), similar to the neighbouring glaciers. On the contrary, nearby Glaciar Perito Moreno shows an exceptional behaviour: the glacier front has been advancing during the first half of the 20th century, staying in an advanced position until the present.

At the beginning of the 20th century, Robert Helbling explored the Argentinean-Chilean Andes together with his friend Friedrich Reichert. In the summer of 1909/10, they started a detailed survey of the highly glacierized Juncal-Tupungato mountains (Río Mendoza basin), leading to the first accurate topographic map of the area published in 1914. Its outstanding quality allows a comparison with contemporary satellite imagery. The area received attention in 1934, when the sudden drainage of a glacier-dammed lake in the upper Río del Plomo valley caused fatalities and considerable damage to constructions and the Transandine Railway. A similar event is reported to have occurred in 1786 according to historical records.

Finally we compare the observed glacier fluctuations of the two regions with other available glacier reconstructions to give an overview of glacier evolution in southern South America since the Little Ice Age.